L6: Entry 5 of 6 File: PGPB May 30, 2002

DOCUMENT-IDENTIFIER: US 20020065682 A1
TITLE: VIRTUAL DOCTOR INTERACTIVE CYBERNET SYSTEM

Abstract Paragraph:
An interactive network-based health information system provides up-to-date medical information directly to a user. The information is tailored to the user's expertise. The user can issue specific follow-up questions, initiate a discussion with a professional, and establish a doctor-patient relationship. The system provides for remote monitoring and diagnosis of the patient and for remote treatment. The different levels of service can be provided and priced on an individual basis.

Summary of Invention Paragraph:
[0005] However, many individuals need more current information, and they often need it quickly. As an example, a patient with superficial bladder cancer that has relapsed from a standard therapy needs to secure the most up-to-date information after being told that the next step is surgery, e.g., the patient, as is common seeks out a second or third opinion. This is costly and time-consuming, especially when this selection process is not necessarily easy for an emotionally distressed patient. Patients also seek to secure information through books, lay articles, or other sources, including information provided through a multiplicity of Internet web sites concerned with health, cancer, or many related subjects. Often web sites dedicated to the specific malady do not exist. Even if web sites do exist which are dedicated to the malady, e.g., bladder cancer, the information is often general and would not necessarily be responsive to this patient's immediate needs. A call to a specialized agency, such as the American Cancer Society or the National Cancer Institute, would also result in securing both general cancer and specific bladder cancer information, but this would also not be tailored to the immediate questions and needs of this patient. Even if the patient were knowledgeable enough to read and understand the medical literature and retrieve this literature through one of the many literature search engines, the different views and often contradictory results can be uninterpretable without some guidance and assistance with regard to differentiating available, accessible, and more investigative interventions, and what their outcomes are.

Summary of Invention Paragraph:
[0008] There is also a need for a virtual doctor which can link diagnostic and treatment devices used by a patient, for example, at home, to a remote facility, which includes a processor that responds to the data gathered, to administer treatment from the remote location.

Summary of Invention Paragraph:
[0010] Access to the various levels of service can be determined by subscription or by the context of the user inquiry. The server can conduct communications with the user through a convenient interface, such as a graphical interface using hypertext markup language or Java or any other suitable programming language and/or environment. In such applications, a user conveniently enters information into a menu transmitted by the server to the user. The particular menu items transmitted are determined by the server based on the user's inquiry. The server can also provide the user with a direct communications path to a professional, such as one

or more medical doctors and an entire team of advisors providing coordinated care and advice via the network. This virtual team can include not only individual professionals, but also automated systems incorporating artificial intelligence features. The advantage of such automated systems is their ability to apply rules and other reasoning techniques to recognize potential negative interactions or other alternatives to treatments recommended by the professionals.

Summary of Invention Paragraph:
[0011] As discussed further herein, the first level of service is primarily informational, allowing a user to request information at the specific level of sophistication appropriate to the user's ability to use the information. At a second level of service the user can comment on the adequacy of the information and the system can determine if referral to a professional is necessary. At a third level of service a client-professional relationship is established and a professional advises the patient concerning the information needed and other actions which should be taken. At this level, the system can also identify several professionals who should form a team to advise the patient. At a fourth level of service, the system physically interacts with the patient, using monitoring devices or treatment devices. The system communicates messages to and from the devices to monitor patient parameters and to administer management advice, including monitoring or treatment, such as with drugs or other chemicals.

Summary of Invention Paragraph:
[0015] Briefly, according to another aspect of the present invention, there is provided a server for an electronic inquiry-based information system, intended for use with a computer connected to the server over a network. The server includes a network connection, a user interface, a system for determining a level of service access for the user, a system for determining a level of sophistication of the user, a search processor, a system related to selecting professionals, and a communication system. The network connection is to connect to the network and to provide a communication path with the computer. The user interface is to present information over the network to a user at the home computer, and to accept an inquiry over the network from the user at the home computer. The search processor is to create search requests used to acquire information requested in the user inquiry. The system related to selecting professionals is for providing a selection of professionals to the user and for creating a team from the selection of professionals for treating a health-related issue of the user. The communication system is for directing the user inquiry to the team of professionals.

Summary of Invention Paragraph:
[0017] Briefly, according to one aspect of the present invention, there is provided a health care system for delivering health care to a patient. The system includes a server, a monitoring device, and a treatment device. The server is communicatively coupled to a network and is for receiving and transmitting signals. The monitoring device is communicatively coupled to the network and is adapted to be connected to the patient. The monitoring device is adapted to monitor the patient and to transmit patient information to the server over the network. The treatment device is communicatively coupled to the network and is adapted to be connected to the patient. The treatment device receives a treatment signal from the server over the network and is adapted to administer a treatment to the patient based on the treatment signal received.

Brief Description of Drawings Paragraph:
[0026] FIG. 8 illustrates a system according to the invention for remote monitoring and/or treatment.

Detail Description Paragraph:
[0027] A system according to the invention can be implemented in multiple levels on a network. One convenient way of implementing such a system is to provide a site on the world wide web of the Internet which can be accessed by the users. Users can

select levels of service from this virtual doctor web site. At the highest level of service according to the invention, advances in telemedicine are incorporated in this virtual doctor web site by linking diagnostic systems available in the home or in local medical facilities to the central web site in order to transmit physical and chemical findings and data for analysis by the advising health professionals. These could involve, for example, cardiac and circulatory functions, blood tests, urinalysis, sputum tests, etc., which can be used to monitor the patient. It is also envisioned that this can be an interactive treatment system, whereby the central monitor can send signals to a monitor in the patient that controls the discharge of energy impulses, chemicals, and drugs that regulate the patient's body functions.

Detail Description Paragraph:
[0036] In the event, for example, that the patient has an incurable malady, or one that is difficult to treat, the system can provide a list of appropriate research studies for which the patient may be eligible. These may be local, regional, national, or international, as selected by the patient, preferably in consultation with the health care advisor.

Detail Description Paragraph:
[0051] FIG. 6 illustrates a third level of service (level 3). As previously discussed herein, level 3 service may require the assistance of one or more specialists. Rather than providing only one professional to guide the user through literature searches and other inquiries, level 3 service contemplates a more complete level of service to the user. For example, level 3 service could provide the user with a team of professionals or specialists who communicate directly with the user about treatment options, risks, side affects, and other matters. Thus, level 3 service tends to focus on the specialist.

Detail Description Paragraph:
[0053] Because many medical issues require input from specialists in various fields, the processor will then determine from the criteria, and the information provided by the user and the doctor in level 2, whether secondary specialists are necessary and in which fields secondary specialists should be consulted. At step 605, the secondary fields are identified and at step 606 the processor can inquire if the user desires to establish the same preferences for selection of specialists in the secondary or related fields. If not, a message is transmitted to the user to adjust the selection criteria in the secondary fields at steps 607. At step 608 the secondary weighing function is established and the process is repeated at step 609 until all of the secondary fields are complete. At step 610 the advising team is selected and at step 611 the counselors determine whether or not they can accept the assignment. Once the counselors have accepted the assignment at step 612 the team list is established. At step 613 messages are routed to the team members concerning the inquiry to establish treatment options or other steps. The team members may select which messages they should be copied on, as their specialty might only be relevant to certain questions.

Detail Description Paragraph:
[0054] FIG. 7 illustrates processing at the most sophisticated level of the virtual doctor system (level 4). Level 4 processing is designed to implement sophisticated telemedicine techniques which would allow a user to be treated periodically or continuously at a remote location from the processor or professionals. Level 4 processing could also be used as a means for transmitting information between treatment centers. In particular, high bandwidth connections may be useful for transmitting image data to be used in diagnostic processes. In addition to the ability to display the image data, processors using artificial intelligence techniques could be used to determine or suggest the importance of the information in the image displays. As a further example, remote professionals could perform or guide remote surgery using the image data and either a digitally controlled operating instrument or under the implementation of local surgeons.

Detail Description Paragraph:
[0055] In a typical application of level 4 processing, at step 701 patient parameters which are being monitored are identified. The parameters could be included in a list and updated either periodically, at the same time, or at different times depending on the physical parameters being monitored and tested. At step 702 the processor will transmit a message to monitor the specific parameters. Depending on the equipment being used, the processor may be required to format the message into data that can be understood and processed by the particular monitoring device. When step 702 indicates that parameters have been checked, at step 703 the parameters are tested to indicate whether the patient requires treatment. If the patient does not require treatment, then at step 704 the information on the parameters is simply recorded and any other level 4 functions which are needed are performed at step 705. If, however, the parameters indicate that the patient does need treatment, then at step 706 it is determined whether the patient is equipped for online treatment. This can be determined either by a database listing or by sending a test message to determine whether the equipment is present at the remote location. The test message has the advantage of not only determining whether the equipment is present, but whether it is connected to the patient and is operational. If the patient is not equipped for online treatment either because the patient does not have the equipment or because the equipment is not operating, at step 707 a message is sent to the treating physicians and to the patient. Control then passes to step 705 which performs other level 4 functions and then terminates the session.

Detail Description Paragraph:
[0056] If at step 706 it is determined that the patient is equipped for online treatment, then at step 708 information is transmitted in a format that can be recognized by the treatment equipment to apply the treatment to the patient. For example, the processor could command the treatment device to inject the patient with drugs or other chemicals. At step 709 the patient's reactions are monitored. If at step 710 the processor determines that the patient's reactions are normal, then at step 711 the parameters are recorded and other level 4 functions can then be performed. On the other hand, if at step 710 the processor determines that the patient's reactions are out of the normal range, then a message is sent at step 712 to the patient and to the health care professional and monitoring continues at step 709. The remote treatment may also be performed in increments, with monitoring between successive treatment steps. An incremental approach thus allows further treatment after an abnormal reaction.

Detail Description Paragraph:
[0057] FIG. 8 illustrates at a high level a system 800 for remote monitoring and/or treatment of a patient. The system 800 includes a server 802 which is connected to a network 804. The system 800 also includes a treatment device 806 and a monitoring device 808 which are each connected to the network 804. In certain embodiments, the treatment device 806 and the monitoring device 808 may be connected to each other.

Detail Description Paragraph:
[0058] The network 804 connects the treatment device 806 and the monitoring device 808 to the server 802. The links can be set up and torn down quickly or left in place. Further, the network 804 can utilize different mediums. The network 804 may use the Internet for links with the monitoring device 808 if those links need not be maintained with high reliability, and the network 804 may also encompass more reliable dedicated lines (land, satellite, or otherwise) for links with the treatment device 806.

Detail Description Paragraph:
[0059] The treatment device 806 and the monitoring device 808 are adapted to be connected to the patient. In this way, patient information, such as blood test results, vital signs, images of the patient, etc., may be monitored by the

monitoring device 808 and transmitted over the network 804 to the server 802. Further, treatments, such as performing a blood test, taking an image of the patient, delivering a drug into the patient, etc., may be administered to the patient by the treatment device 806. The treatment device 806 may be internal or external to the patient's body. It is clear that a treatment device may include, without limitation, both therapeutic and diagnostic equipment and that a treatment device can perform both therapeutic and diagnostic procedures. Further, a treatment signal may then include a signal from/to either a diagnostic or a therapeutic device. Additionally, a monitoring device may perform a variety of functions that are considered to be diagnostic.

Detail Description Paragraph:
[0060] The system 800 can also have a second treatment device 810. The second treatment device 810 can be connected to the server 802 and can communicate with either or both of the treatment device 806 and the monitoring device 808. In one embodiment, the second treatment device 810 receives patient information from the monitoring device 808 and sends a treatment signal to the treatment device 806. In such an embodiment, the treatment signal may effectively control the treatment device 806, but need not necessarily do so.

Detail Description Paragraph:
[0061] The interactive level of the system may also provide image data. The image data allows remote observation of a patient's condition, preferably both internal and external. The image data may include, for example, medical imaging data (such as from nuclear, computed tomography, ultrasound, X-ray, and other imaging cameras and systems at a medical facility) and patient-viewing data which thereby allows the patient to be viewed by the doctor at a remote location. A patient-viewing camera may be, for example, a still-motion camera or a video camera. A patient-viewing camera may be necessary, for example, for examination of certain physical signs (e.g., neurological status, mental state and functions, dermatological signs, etc.). The system can also provide two-way and multiple-party video conferencing services, that allows video conferencing by two or more parties. Image data can thus be used for a variety of functions, including without limitation, monitoring, diagnostic, and therapeutic/treatment. Further, the imaging equipment can be considered to be a monitoring device, a diagnostic device, and a therapeutic or treatment device, depending upon the application.

Detail Description Paragraph:
[0062] There are many ways in which a practitioner may control the treatment of a patient. A monitoring device or monitoring equipment may communicate the patient's body functions or chemistry to a central monitoring system. A monitoring device can also transmit health-related information about a user over the network to the server for use by a team of professionals in treating the health-related issue of the patient. The information can be used for diagnostic and therapeutic purposes In the latter case, a treatment signal, i.e., a telemedicine signal, can be transmitted over the network to a treatment device or treatment equipment connected to the patient. A treatment device may be separate from or integrated with a monitoring device. The treatment signal can control the device or equipment which is connected to the patient. The device may effect a treatment in the patient. A treatment can include, without limitation, effecting a change in body function or chemistry, such as by administering a drug or impulse, and it can include performing a test of the body, such as a blood test. The device may be remotely-controlled or the practitioner can transmit control information to the patient, or another individual, who would then have to control the equipment. The device may deliver a treatment using myriad methods. For example, it may stimulate the patient with an electrical or other impulse, or it may release a chemical or drug. The chemical or drug can be contained in a reservoir which is implanted in the body or which is external to the body, and the reservoir may also be timed-release or controlled-release. In one embodiment, the release is controlled by an implanted computerized chip linked into the communication system. The link into the

communication system need not be hard-wired. For example, another piece of equipment may receive a treatment signal over the network and then send a radio frequency signal to a receiver which is implanted in a patient who is sleeping nearby.

Detail Description Paragraph:
[0063] The treatment device may also perform more complicated functions. It may receive body function signals from the patient, analyze these signals, and then return a signal to the patient that effects the treatment or test. The treatment device may also perform monitoring functions and transmit any or all of this information to a practitioner over the network.

Detail Description Paragraph:
[0064] A treatment device may also be located remotely from the patient. In one embodiment, a remote treatment device receives patient information, such as the results of a blood test or information from an examination, and sends a treatment signal over the network to a local treatment device which is connected to the patient. In this way, the remote device can receive monitored patient data and generate appropriate treatment signals to control, for example, a chip implanted in the patient which releases a chemical.

Detail Description Paragraph:
[0065] Patient Charles has experienced blood in his urine over the past two months, and seeks medical assistance. His doctor confirms that there is blood in his urine, and recommends a cystoscopy by a urologist, who finds evidence of a malignant-appearing lesion. A biopsy is taken, which reveals superficial urothelial carcinoma. The urologist recommends a course of BCG immunotherapy into the bladder. He is told that this has a generally good response rate, but the tumor can recur and require additional therapy, possibly including, at some time, surgical resection of the bladder if spreading to the bladder muscle occurs. Patient Charles knows little about this problem, is distraught, and needs further advice. He does not know if he should go to some well-known cancer center in his city, call the American Cancer Society, or talk to other family doctors he knows. He decides to call the American Cancer Society and receives a general pamphlet on the incidence, mortality, and prognosis, including different management methods, of bladder carcinoma. This gives him more concern, and he therefore links to the virtual doctor web site of this invention, where he requests, from Level 1, information on the management, side effects, and outcome of superficial bladder cancer, requesting information for the level of relatively uninformed lay patients. He receives a recently-updated summary of the management of superficial bladder carcinoma, tailored to his geographic domicile, because there are some differences in medical practice in different regions of the world. The summary includes BCG immunotherapy, the results achieved, alternatives to intravesicular chemotherapy, and a listing of some institutions and doctors who practice these methods in his geographic region.

Detail Description Paragraph:
Level 2 Service to Recently Treated Bladder Cancer Patient

Detail Description Paragraph:
[0066] Patient Charles went through a course of therapy with BCG, and is now told by his urologist that the tumor has recurred again, requiring some surgical intervention and removal of urothelial mucosa in the region of the neck of the bladder, and possibly some irradiation to this region. He is told that there could be post-therapy side effects, including adhesions, urination difficulties, pain, incontinence, etc. The patient's first course of therapy evidently was not as successful as intended and now he does not know what to do. He then contacts the virtual doctor web site, to which he has registered, and requests a second level of service, specifically asking for options in cases such as his. The service provides a synopsis of the medical literature on treatment of recurrent and locally invasive, but still superficial, urothelial carcinoma. The patient reads this, but

becomes even more fearful that he might not choose the best of the different approaches described. He then elects to subscribe to a Level 3 consultation service.

Detail Description Paragraph:
[0067] After registering at this level, the patient informs the service of his particular problem, and asks for a urological specialist who is an expert in the management of recurrent superficial urothelial carcinoma, and who is familiar with medical practices in the New York City area. The service provides two names of urologists participating in this cyberspace service who are experienced in the treatment of bladder cancer, and who practice in the New York area. Dr. Y of Mount Sinai Medical Center is chosen by the patient, and he registers his particular question with the doctor through the service, using the e-mail contact service provided at Level 3. Dr. Y of Mount Sinai responds directly to the patient on the special web site link arranged for such consultations, and gives patient Charles a series of questions regarding his past diagnosis and treatment, including the recommendations made by his current urologist for surgery and irradiation. Dr. Y summarizes the experience in this cancer type and stage for the patient, and advises him that his current doctor is following the best course of action, but also that there is a 40% chance that the benefit derived will only be temporary, and that later therapy may still be required. Patient Charles now feels more confident that he is making the right choice, and proceeds with the therapy recommended by his own urologist.

CLAIMS:

11. A system as recited in claim 10, the processing device being programmed to cause the device at the user's location to administer treatment to the user.

12. A system as recited in claim 3, the processing device being programmed to monitor selected parameters associated with a user and to communicate messages to a device which is remote from the user's location, wherein the processing device causes the remote device to administer treatment to the user.

29. A server for an electronic inquiry-based information system, intended for use with a computer connected to the server over a network, the server comprising: a network connection to connect to the network and to provide a communication path with the computer; a user interface to present information over the network to a user at the home computer, and to accept an inquiry over the network from the user at the home computer; a system for determining a level of service access for the user; a system for determining a level of sophistication of the user; a search processor to create search requests used to acquire information requested in the user inquiry; a system for providing a selection of professionals to the user and for creating a team from the selection of professionals for treating a health-related issue of the user; and a communication system for directing the user inquiry to the team of professionals.

33. A health care system for delivering health care to a patient, the system comprising: a server, communicatively coupled to a network, for receiving and transmitting signals; a monitoring device, communicatively coupled to the network and adapted to be connected to the patient, which is adapted to monitor the patient and to transmit patient information to the server over the network; and a treatment device, communicatively coupled to the network and adapted to be connected to the patient, which receives a treatment signal from the server over the network and is adapted to administer a treatment to the patient based on the treatment signal received.

34. A health care system as recited in claim 33, wherein the treatment comprises a diagnostic procedure and the treatment device comprises a diagnostic device.

35. A health care system as recited in claim 33, further comprising a second treatment device, communicatively coupled to the server and remote from the patient, which receives the patient information from the monitoring device, analyzes the patient information, and transmits a treatment signal to the treatment device based on the patient information.

36. A health care system as recited in claim 33, wherein the treatment signal results in a treatment selected from a group consisting of an electrical impulse, a chemical stimulus, and a measured release of substance contained in a controlled-release reservoir implanted in a body of a patient and whose release is controlled by an implanted computerized chip.

Previous Doc Next Doc Go to Doc#

Refine Search

Search Results -

Terms	Documents
L5 and (subject$6 or descript$6) same (percept$6 or view$3 or thought$)	6

Database:
US Pre-Grant Publication Full-Text Database
US Patents Full-Text Database
US OCR Full-Text Database
EPO Abstracts Database
JPO Abstracts Database
Derwent World Patents Index
IBM Technical Disclosure Bulletins

Search: L6

Refine Search | Recall Text | Clear | Interrupt

Search History

DATE: Sunday, August 06, 2006 Printable Copy Create Case

Set Name side by side	Query	Hit Count	Set Name result set
	DB=PGPB,USPT; PLUR=YES; OP=ADJ		
L6	L5 and (subject$6 or descript$6) same (percept$6 or view$3 or thought$)	6	L6
L5	l4 and (treatment or treat$6)	50	L5
L4	L3 and (sens$3 or prob$3)same patient same(articulat$6 or talk$6 or answer$6 or questionnaire or question$6)	52	L4
L3	(medical$2 or hospital$6 or healthcare) same user same interfac$3 same (taxonmoy or lexicon or phraseolog$6 or language)	226	L3
L2	L1 and (quer$6 or search$6) same (question$6 or respons$6)	12	L2
L1	(medical$2 or hospital$6 or healthcare) same user same interfac$3 same (collect$6 or group$6) same (taxonmoy or lexicon or phraseolog$6 or language)	30	L1

END OF SEARCH HISTORY